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TRIDENT SSBNs IN START

By

RICHARD T. ACKLEY

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Director
Defense Nuclear Agency
HQ DNA/NASF
6801 Telegraph Road
Alexandria, VA 22310-5000

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

Rear Admiral Ralph W. West, Jr.
Superintendent

Harrison Shull
Provost

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This report was prepared by:

RICHARD T. ACKLEY

Reviewed by:

THOMAS C. BRUNEAU
Chairman
Department of National Security Affairs

GORDON E. SCHACHER
Dean of Faculty and Graduate Studies

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This report advocates not agreeing to ballistic missile warhead sublimits in START in order to place maximum reliance on the Trident/D-5 strategic weapon system. With reduced numbers in our post-START inventory, it is manditory to emphasize our most survivable, capable, flexible and affordable systems for deterrence and defense.

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The Strategic Arms Reduction Talks (START) resumed on 19 June 1989 with a Soviet-American arms control agreement as the expected outcome. Despite the fact there is a partial agreement in hand, an issue concerning strategists, planners, arms controllers and analysts alike is the disagreement over sublimits on intercontinental ballistic missile (ICBM) and sea-launched ballistic missile (SLBM) warheads or reentry vehicles (RVs). The U.S. has proposed a sublimit of 3,000 to 3,300 on the number of ICBM warheads to reduce Soviet reliance on this destabilizing type of weapon system. The Soviets, on the other hand, consider all nuclear weapons equally destabilizing and reject the U.S. ICBM sublimit proposal unless both sides agree to impose the same sublimit on warheads carried by SLBMs on board submarines.[1] Resolution of this issue will determine long term force structures and more importantly, the credibility of the U.S. defense posture into the future.

The purpose of this report is to advocate NOT agreeing to ballistic missile warhead sublimits in order to allow the U.S. the option of placing maximum reliance on sea-based strategic forces. These forces are the most survivable, capable, flexible and affordable we can field today and into the foreseeable future. This approach is strategically and fiscally pertinent in todays funding climate that targets a reduction in the Department

of Defense (DoD) budget in the face of an ongoing struggle to fund new untested mobile land-based strategic systems. It follows that we should not be locked into ballistic missile warhead sublimits involving new, unproven and potentially vulnerable weapon systems. In other words, numerical limits should be set, but the force mix left open to national choice.

Agreed upon START parameters to date include:

- 1,600 Strategic Nuclear Delivery Vehicles (SNLVs) total for each sides intercontinental ballistic missiles (ICBMs), submarine launched ballistic missiles (SLBMs) and heavy bombers.
- 6,000 accountable warheads (RVs) on the SNDVs, with not more than 4,900 on ballistic missiles.
- Total throw-weight (TW) of 50% below current Soviet levels.

If such a regime were verifiable and in place today, it would impose U.S. force reductions more severe than the self-imposed SALT limitations, but retain strategic stability and codify deep strategic force reductions--a desirable arms control outcome. On the other hand, setting a 3,000 - 3,300 maximum on ICBM RVs might provide a near-term advantage to the U.S. by limiting Soviet land-based first-strike weapon systems. However, as the Ohio-class nuclear powered ballistic missile submarine (SSBN) with the D-5 (Trident II) missile come on-line, the strategic advantage would shift profoundly to the Soviet side for both the mid-term and long haul.

In the 1980s the U.S. land-based ICBM force became vulnerable to Soviet technological advances in ICBM (RV) accuracy and their limited Anti-Ballistic Missile (ABM) defense. Additionally, the Soviet's began fielding mobile ICBMs that presented unmanageable targeting problems for the U.S. At about the same time Soviet underground command post and missile silo hardening denied our Minuteman force the ability to destroy these facilities. It appeared Soviet ICBMs were destabilizing and should be limited. In response, U.S. mobile land-based missile systems were considered. However, they remain contentious because of high costs, concern for survivability, political-environmental objections to their mobility and the fact they haven't been tested and proven. Offsetting the land-based threat with land-based forces begins to appear less appealing than offsetting it with new improved sea-based systems.

The critical question is, are symmetrical ballistic missile warhead sublimits for the U.S. and Soviet force structure in the U.S. interest, and if so can they realistically be negotiated? The Soviet Union emphasizes land-based missiles because of:

- Its history as a continental power
- Their lack of the domestic political and environmental constraints present in the U.S., and
- Its large land area and comfort with an "umbilical cord" to control forces within its borders.

On the other hand, the U.S. stresses sea-based systems because of:

- o Their capability, flexibility and survivability (they are invulnerable at sea with or without strategic warning),
- o Our population density (SSBNs on patrol do **NOT** act as lightning rods for a strategic "lay down" on the continental U.S.)
- o Our advanced submarine technologies including redundant connectivity with the National Command Authority (NCA), and
- o Our tradition as a naval power.

Within these parameters, an attempt to set agreeable and favorable sublimits on particular system types is neither in our interest nor realistically negotiable. It follows that 4,900 warheads on 1,600 strategic nuclear launch vehicles (SNLVs) with each side free to select its own launch platforms and force mix is the realistic and more sensible approach. In order to maintain strategic stability at reduced levels, the U.S. must opt for its most survivable, flexible and affordable systems for the deterrence of nuclear war.

Today, as prior to the START talks, the Navy considers 20-22 Ohio-class SSBNS equipped with the Trident II (D-5) missile as a force goal. This equates to 480 - 528 Trident SNLVs and 3,840 - 4,224 Trident RVs. A Soviet imposed limit of 3,000 SLBM RVs, for example, would limit the U.S. SSBN force to 15 Ohio-class SSBNs rather than the 20-22 needed for credible deterrence and economy of scale for cost effective operations and

base support in the Atlantic and Pacific oceans.

The question is: can we deploy 20-22 Tridents leaving only 1,060 - 676 RVs for the ICBM force and maintain strategic stability? The affirmative argument rests upon the survivability, capability, flexibility and known cost outlays for the Trident SSBN and D-5 missile systems. As desirable as it may be, for the last 15 years this country has been unable to field a survivable ICBM force.[2]

Just what makes the Trident/D-5 strategic system desirable? The U.S.S. Ohio-class submarine exceeds design specifications in both performance and quietness. Congress has authorized 16 Tridents and the 17th is in the FY-90 budget request. Each of these strategic submarines is designed for a 70/25 day deployment/turn-over cycle equating to 66% at-sea time.[3] The first eight Ohio-class SSBNs are armed with the Trident-I (C-4) ballistic missile. The U.S.S. Tennessee (SSBN 734) reached initial operational capability (IOC) in May 1989 and will be armed with the first load of Trident-II (D-5) SLBMs in 1990. The D-5 missile production line will turn out five to six missiles per month until the entire 726-class is fully equipped.

The D-5 SLBM is a 44-foot long, three-stage missile with a range of about 6,000 nm's. Each missile carries eight multiple independently targeted re-entry vehicles (MIRVs). The ninth of 20 scheduled missile tests from land-launch pads was completed on 21

January 1988 with a record of eight successes and one failure. Although the first and third submerged D-5 launch from the USS Tennessee malfunctioned, seven subsequent shots were successful. The sixth successful shot on 12 February 1990 officially ended the test program. The system is "on track" and by early 1990 will be operational and competitive with all (present and planned) U.S. land-based ICBMs.

The D-5 is hard-target capable, meaning it can destroy command posts and hardened missile silos from safe distant positions at sea insuring SSBN survivability now and into the future. The SSBN can link into the NAVSTAR satellite navigational system, and with existing on-board position keeping, guaranty own ship's location within 10 feet.[4] Improved submarine position fixing and the mid-course stellar up-dates of the D-5 missile insure that eight 150 KT highly accurate RVs can be delivered on target.[5]

Survivability is a major factor favoring sea-based forces. Despite recent Soviet advances in acoustics, Trident is the world's quietist submarine. It maintains prelaunch survivability through mobility in ocean space being invulnerable to all known forms of Anti-Submarine Warfare (ASW). ICBM forces are based in the central portion of the U.S. whereas Trident submarines patrol in an area about four times the entire size of the U.S. Without doubt, the SSBN is the most survivable arm of

our strategic TRIAD. "There is no scientifically plausible prospect for an ASW technology breakthrough which would provide a basis for a threatening attack through the 1990's and probably well beyond."[6] There simply is no credible evidence to indicate a "transparent ocean" is on the horizon, but air space above land-based missiles **IS** transparent.[7] If there were to be a major ASW breakthrough, the U.S., as a world leader in this field, would be the first to know.

On the other hand, the location of ICBM silos are well known and missile flight paths approximate a great circle to the target. Since an adversary has a good sense of what we target, his active defenses will be positioned in the most favorable of locations.[8] Even with the proposed MX rail garrison and Small ICBM (SICBM) mobile systems, several hours of warning are required to put significant distance between the missile and its base. Additionally, U.S. land-based missiles will be subject to political constraints tying them to their deployment bases. Consequently, civil authorities do not welcome rail or road mobile missiles roaming off military reservations into their jurisdiction. If mobile missiles only deploy in time of increased international tension, such movement could be interpreted by the Soviets as preparations for a preemptive strike. Besides, in contrast to land mobile systems, the navy has solved, practiced and demonstrated mastery of the navigation, communications and targeting problems associated with mobile

strategic forces. This is not the case with proposed U.S. mobile ICBMs.

Should deterrence fail SLBMs from forward deployed submarines, having a short time-of-flight, could be the first strategic weapons to arrive on target. Because of SSBN survivability, withheld SLBMs would be available for retaliatory strikes, saved for war termination bargaining, or both. The SSBN force provides **CERTAINTY** of retaliation--the crux of deterrence.

Communication reliability between the National Command Authority (NCA) and the SLBM force under conditions of wartime stress has been questioned by strategists and politicians. Redundant world-wide communications are in place. Submarine UHF, HF, LF, VLF, ELF, the USAF's National Emergency Airborne Command Post (NEACP) and Emergency Rocket Communications System, Strategic Air Command (SAC)'s Airborne Command Post (Looking Glass), the Defense Satellite Communications System (DSCS-II/III) and the Navy's E-6A aircraft (TACAMO) system exist and work. It is inconceivable for an SSBN on alert to miss an "Execution Message."

The extremely low frequency (ELF) system provides both "bellringer" alerting information for submarines operating at deep depths or at high speeds and operational instructions. This low data-rate system (six - seven minutes per letter) is not susceptible to EMP or jamming. When the submarine hears an

alerting sequence or loses the continuous broadcast signal, it immediately comes to communications depth and slows to monitor other navy, air force and JCS frequencies. Additionally, a two letter sequence on ELF can provide over 600 variant instructions compiled in a code book.[9] Since most analysts consider an "attack from the blue" the least likely of all nuclear war scenarios, probability is high the ELF system will provide the SSBN force with strategic warning.

Submarines can receive traffic on ultra-high frequencies via the fleet communication satellite (FLTSATCOM) system. When the Military Strategic-Tactical and Relay (MILSTAR) system becomes fully operational in the early 1990s, SSBNs will have another jammproof communication option through frequency-shifting techniques, and at an altitude higher than anti-satellite system now operate. Laser communication systems are in research and development for future submarine applications.

The issue, however, is how survivable (useable) are these systems in a nuclear environment? The Navy is confident that some communication links will survive providing at sea submarines with warning and an "execution message" with the same or a higher degree of reliability than expected for ICBMs and bombers--if the latter survive at all! If an EAM is released, the SSBN force will receive it. Even in the worst possible case where the NCA, its successors, all primary and alternate command posts, ICBM

fields, bomber bases and submarine bases are destroyed in a preemptive nuclear attack, SSBNs at sea could respond. U.S. and allied naval and merchant ships are routinely located throughout the world's oceans. These ships can provide high-frequency (HF) relay for an EAM if one is released by a reconstituted U.S. national leadership and put "on the air" by any means.

In addition to the Ohio-class SSBN being able to execute a full range of strategic options under all conceivable conditions when equipped with the Trident-II missile, other fringe benefits occur. For instance, because sea-based systems are survivable, they do not require the costly strategic operational and warning organizations needed to provide the ICBM and bomber forces with enough warning to preclude the "use 'em or lose 'em" dichotomy. And, in a domestic political sense, the SSBN system has a minimal effect on the environment.

Every indicator points to continuing SSBN system survivability and invulnerability. The D-5 missile is designed for both hard and soft targeting with the accuracy and yields necessary to accommodate the widest range of strategic options. The issue of unreliable communications with strategic submarines simply is a non-issue.

Today's SLBM force

> ". . .carries almost 50 percent of the strategic warheads in our country's inventory for only about 25 percent of the Department of Defense strategic

budget. These costs represent about 10 percent of the navy's total budget. . . ."[10]

The cost of each deliverable Trident II weapon is about $12 million, counting procurement and operations and support costs for both the submarine and missile. This is considerably less than the $16 million for the rail-garrison MX, or the $70 million for the Midgetman or Small ICBM.[11] Neither the rail-garrison MX nor the SICBM can offer the level of survivability available to the Soviet SS-24s and -25s because of restricted movement resulting from U.S. political constraints.[12]

With two thirds of the Trident force on alert at any one time, a 20 ship force means 12 would be at sea in an ungenerated situation, and with 22 SSBNs 13 would be at sea. Numbers of SSBNs could be increased, however, if START counting exempted SSBNs in overhaul.

The D-5 is a major step in stabilizing our deterrent posture today. However, weapons with different capabilities will be required for the future. For example, it is known that the Soviet Union has turned to mobility and hardening for survivability of their strategic offensive forces. Introduction of the land-based SS-24 and SS-25 mobile missiles and construction of superhardened missile silos and command centers is in progress. Many analysts believe most Soviet strategic targets will be mobile, or "Strategic Relocatable Targets" (SRTs), by the year 2000. The MIRVed D-5 missile is not well

suited for "counter battery fire."

SLBM modernization will consider a host of new payloads for the D-6 and later SLBMs. Examples of these payloads include:

- The Earth Penetrating Weapon (EPW) to attack deeply buried targets. In spring of 1987 a joint Air Force-Energy Department team found that a strengthened B83 nuclear bomb casing could burrow 11 to 13 feet into frozen Alaskan strata.
- Single RV payloads for post-SIOP war fighting.
- Anti-SRT payload possibilities include a payload that releases a cruise missile that would loiter, identify then attack the SRT. Another variation is employing a MaRV to slow down reentry speed to permit time for SRT identification and attack. These approaches are now conceptual, not operational.

Because of throw-weight limitations, the probability is that reentry vehicles with the above capabilities would only be able to carry a single payload at reduced range.[13]

Possibilities for nonlethal "combat support" payloads to permit more SSBNs to be at sea include SPINSATs, LIGHTSATs, and CHEAPSATs to reconstitute communications after an Electro-magnetic Pulse (EMP) high altitude nuclear burst, or a nuclear exchange.[14]Even Anti-Satellite (ASAT) weapons launched from an SSBN missile launch tube need to be considered.[15]

If a START agreement suggests it prudent to have more submarines carrying fewer weapons, these possibilities exist:

- o Plug some launch tubes on the Ohio-class SSBN.
- o Download the number of MIRVS on the D-5.
- o Modify some Ohio-class launch tubes for "heavy single payload" vehicles.
- o Develop a new smaller SSBN with fewer launch tubes.

Each of these options, individually or in combination, has advantages and disadvantages that must be assessed.

Plugging "x" number of the Trident launch tubes would allow more submarine platforms to operate at sea thereby forcing the Soviets to search larger areas for more and less valuable targets. For ships being built this is easier than for existing submarines in terms of verification. Plugging tubes may involve intrusive inspections to be acceptable to the U.S.S.R. Also, it would increase the overall sea-based force cost per warhead on target.

Downloading RVs on MIRVed missiles presents similar problems as plugging missile tubes; that is, verification and higher cost per warhead on target. Production monitoring, tagging and post-deployment inspection are likely outcomes. Additionally, it would open a real opportunity for strategic "breakout" by cheating on either side unless extremely intrusive inspection measures are negotiated. On the plus side, fewer RVs equates to longer ranges. In all probability, a completely new missile would be demanded by the Soviet Union if the number of accountable RVs were to be less than eight.[16]

Modifying missile launch tubes for "heavy single payloads" also flies in the face of verification. Undoubtedly, there would have to be significant observable modifications, verifiable by national technical means to take this path. An alternative would be to modify six to eight SSBNs with special "heavy single payload" launchers not compatible with C-4 or D-5 missiles. These vessels would have to be on patrol cycles with D-5 armed SSBNs for maximum flexibility and deterrent stability. This option offers a "hedge" against a continued Soviet shift to mobile and single RV strategic offensive forces by allowing the U.S. more Trident submarines and providing a bonus of ASAT and communications reconstitution capability.

Developing a new smaller SSBN with fewer launch tubes, on first impression, sounds attractive. However, when one considers that the Ohio-class is in production, is quiet, and meets or exceeds all its design specifications one is hard pressed to suggest "start-up" for a newer and less capable SSBN at todays inflationary costs. Besides, it is basic in submarine design that "stealth equals quiet equals big." Sound-quieting of rotating machinery is volume and cost-intensive. The noisiest nuclear submarines are the smallest, the U.S. NR-1 and the Soviet Alfa-class. Trident and Typhoon are large and quiet. Until passive acoustics are replaced by futuristic non-acoustic proven technologies for ASW, large submerged platforms will be required for stealth.[17]

What then would make a sensible strategic offensive deterrent force at the onset of a START regime without sublimits? Capt. Linton F. Brooks, USN may have summed it up best when he wrote:

> Impressive new capabilities gained by the deployment of the Trident II submarine-launched ballistic missile, declining political support for intercontinental ballistic missiles (ICBMs), and continued questioning of the viability of strategic bombers will combine to thrust the mantle of strategic preeminence on the Navy.[18]

Assuming the Ohio-class SSBNs armed with D-5 missiles, initially there could be 20-22 TRIDENTS, 50 MX, a minimum of 186 Minuteman ICBMs and depending upon counting rules, an affordable mix of manned bomber aircraft to fill in the remaining 884 SNLVs carrying 1,100 RVs. Such a force seems smart for a START today. Without sublimits, and by downloading SLBMs or substituting combat support payloads, additional submarines (or land-based missiles) could be deployed if advancing technologies warrant changes in our force mix. The point is, at reduced START levels and with severe budget constraints, a maximum deterrent posture with tested survivable, capable, flexible and affordable forces exists in the TRIDENT SSBN/D-5 system, leaving future options open to make changes if needed.

NOTES

[1]Soviet Military Power: Prospects for Change 1989, (G.P.O.: Wash. D.C., 1989), p. 90.

[2]"Islands of Excellence, Vectors of Pressure: Interview with R. James Woolsey," Sea Power, July, 1989, p. 18.

[3]Assuming a 12 year overhaul cycle, ninety percent of the Trident SSBN force can be at sea in a generated situation.

[4]Douglas Dalgleish & Larry Schweikart, "Trident and the Triad," U.S. Naval Institute Proceedings, June, 1986, p. 76.

[5]To insure a hard target kill capability, a larger and heavier high-yield warhead, the MK-5, is being developed.

[6]Statement of Vice Admiral D. L. Cooper, U.S.N., Assistant Chief of Naval Operations (Undersea Warfare) before the Subcommittee on Seapower and Strategic and Critical Materials of the House Armed Services Committee on Status of Submarine Force, 2 Mar. 1989, p. 13.

[7]See Richard Ackley, "Subs Forever," Proceedings, July, 1988, pp. 68-71.

[8]Richard Ackley, "The Credibility of our SSBN Force," Submarine Review, Jan. 1989, pp. 12-13.

[9]Jon Boyes and W. J. Ruhe, "TRIDENTS," The Submarine Review, Oct. '89, p. 23.

[10]Statement of Vice Admiral D. L. Cooper, p.10.

[11]Rear Admiral William J. Holland, Jr., USN (Ret.), "The End of the Triad? Why SSBN Advances Make a Dyad Possible," Arms Control Today, Sept. 1989, p. 13.

[12]Frank J. Gaffney, Jr., "Mobile Missile Deal is Shot Full of Holes," Los Angeles Times, June 29, 1989, Pt. II, p. 7.

[13]Derived in part from Mark Rounsavill, "The START Force Structure: ICBM Leg of the Triad," Mar. 1989, An unpublished seminar paper for the Strategic Studies Program, Calif. State University, San Bernardino.

[14]See William E. Howard III, "Cheaper by the Dozen?" U.S. Naval Institute Proceedings, Feb. 1989, "Darts & Laurels," Armed Forces Journal International, Feb. 1989, p. 91 and Bob Davis, "Fleet of Big Defense Satellites may be Future Pearl Harbor Awaiting a Dec. 7," The Wall Street Journal, Feb. 9, 1989, p. A-24.

[15]See Richard T. Ackley, "SABMIS -- SUBMERGED," The Submarine Review, Oct. 1986, pp. 85-87.

[16]See Michele A. Flournay, "START Thinking About a New U.S. Force Structure," Arms Control Today, July/August 1988, pp.

8-15 and James L. George, "Start and U.S. Strategic Force Vulnerabilities: Can 'Downloading' Provide the Answer?" Strategic Review, Fall 1988, pp. 21-27.

[17]Jim Patton, "The SSn--A New Player?" Defense Science and Electronics/25, Sept. 1987.

[18]Capt. Linton F. Brooks, USN, "Dropping the Baton," U.S. Naval Institute Proceedings, June, 1989, p. 32.

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V. P. Naval Submarine League
11807 Wayland Street
Oakton, VA 22124

VADM Patrick J. Hannifin, USN (Ret) 1
President, Pacific SW, Naval Submarine League
765 Santa Camelia Drive
Solana Beach, CA 92075

RADM Karl L. Kaup, USN
Director, Strategic Submarine Division 1
OPNAV (OP-21)
Washington, DC 20350

Library 1
California State University
5500 University Parkway
San Bernardino, CA 92407

CAPT Robert Cox, USN (Ret) 1
President, San Diego Council Navy League
517 Savory Street
San Diego, CA 92106

Dr. David Stanford 1
Corporate Vice President
Science Applications International, Inc.
1710 Goodridge Drive
P. O. Box 1303
McLean, VA 22012

Dr. Robert L. Strickler 1
Manager, Advanced Systems
TRW Defense Systems Group
Ballistic Missile Division
P. O. Box 1310
San Bernardino, CA 92404

Mr. S. L. Guille 1
Director, Navy Program Support
Autonetics Marine Systems Division
Autonetics Electronics Systems
Rockwell International Corporation
1745 Jefferson Davis Highway
Arlington, VA 22202

Professor Richard T. Ackley 5
California State University, San Bernardino
National Security Studies
5500 University Parkway
San Bernardino, CA 92407-2397